Pranav Minasandra

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Indian Institute of Science,
Bangalore - 560012.

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Interests

I am generally interested in animal movement and collective behaviour, and the implications they have on other biological processes. I enjoy problems that demand solutions that use combinations of *computational, data-driven, and theoretical* methods. Trying out this crap.

Education

Max Planck Institute for Animal Behaviour, Konstanz, Germany
PhD as a member of the International Max Planck Research School (IMPRS) of Organismal Biology with a DAAD-GSSP scholarship. — 2020 onwards

Indian Institute of Science (IISc), Bengaluru, India
1-year Master of Science in Biology — 2019 - 2020
+ 4-year Bachelor of Science (Research) with a major in Biology — 2015 - 2019
Current CGPA - **6.3** / 8.0

Publications

Minasandra, P., & Isvaran, K. (2020). Truncated power-law distribution of group sizes in antelope. *Behaviour*

Research experience

Behaviour state dynamics using accelerometry and Machine Learning
Supervised by Dr Ariana Strandburg-Peshkin[1]
Studied behavioural state dynamics using Spotted Hyena (*Crocuta crocuta*) accelerometry data and Developed a classifier for recognising behavioural states using accelerometer data in Hyenas. — 2019 May-Now

Vegetation impermeability and animal movement
Supervised by Dr Maria Thaker[2] — 2018 Feb-2019 Apr
Used computational (agent-based) methods and field observations to investigate the effects of impermeable vegetation on animal movement strategies; and the effects of such movement on vegetation patterns.

Risk-Reward strategies of animals in a fragmented habitat.
Supervised by Dr Kavita Isvaran[2] — 2018 Aug-Now
Modelled habitat use patterns and their effects on populations of animals in a habitat fragmented by human intervention. This was done using difference equation modelling. Currently mentoring an undergraduate student who is taking this project forward.

[1]Department of Biology, University of Konstanz
[2]Centre for Ecological Sciences, Indian Institute of Science

Group size distributions in an antelope

Supervised by Dr Kavita Isvaran[2]. 2017 Mar-2017 Aug
Used mathematical and statistical techniques to determine the best possible distribution function to describe group sizes of Blackbuck *Antilope cervicapra*.

Relevant courses

Graduate level

Stochastic and Spatial Dynamics in Biology; Game Theory and Mechanism Design; Pattern Recognition and Neural Networks; Theoretical Ecology; Advanced Ecological Statistics; Quantitative Ecology; Animal Behaviour; Plant-Animal Interactions; Ecology: Principles and Applications; Technical writing and presentation; and Research Communication.

Undergraduate level

Experiments in Ecology and microbiology; Analysis and Linear Algebra (I and II); Probability and Statistics; Introduction to Scientific Computing; and Algorithms and Programming;

Fellowships

Deutscher Akademischer Austauschdienst - Graduate Student Scholarship Programme (DAAD-GSSP)

Nominated by the IMPRS for Organismal Biology based on an evaluation of a proposal; followed by an interview. 2020 Oct onwards

Kishore Vaigyanik Protsahan Yojana

All India Rank : 135 2015-2020
Includes stipend and contingency

Teaching

Teaching Assistantship

For the course *Quantitative Ecology: Research Design and Inference* 2019 Aug - Dec
Conducted several classes, graded assignments, managed course website.

Mentored undergraduate student

Mentored and guided Ananya Passi in a mathematical modelling project focussing on habitat use and population dynamics. 2019 May-Now

Schools Conferences Seminars

Simons - NCBS *Physics of Life* Monsoon School

An undergraduate and graduate level school on mathematical biology, by researchers from across India in the relevant fields. *One among 37 students selected from across India.* 2017 Jun

GubbiLabs *Mapping Essentials* 2018

An intense training programme on open source mapping 2018 Apr

Technical skills

Programming languages
Python; R; Linux scripting using Bash; LaTeX; Matlab; C

Mathematical modelling
Models incorporating spatial and stochastic variables; Non-linear dynamics, including population dynamics and evolutionary dynamics; Probability models; Numerical simulations of all the above.

Spatial analysis
Familiar with simulating spatially explicit PDEs; Familiarity with qGIS; Efficient use of Google Earth

Statistics
Strong background with probability theory; Distribution fitting; Heavy-tailed distribution fitting; Quantitative analysis of movement; GLMs; Linear Models; Basic statistical techniques

Computational skills
Parallel processing in Python using `multiprocessing`; Methods in machine learning; Front-end development in `R Shiny`; Agent based models; data visualisation using `matplotlib`; Data Analysis and visualisation in R; familiarity with a wide range of python libraries; methods in Scientific Computing.

Miscellanea
Technical writing

Services

Developed R ShinyApp for an age-structured COVID-19 compartmental model for Indian states, for outreach.

Convener, Naturalists - the IISc UG Biology Club

Initiated a semester-long lecture series called Umwelten

Founded the UG Theoretical Biology Circle at IISc

References

Dr Ariana Strandburg-Peshkin,
Department of Biology, University of Konstanz, Germany
Contact: arianasp@gmail.com

Dr Kavita Isvaran,
Centre for Ecological Sciences, Indian Institute of Science, Bengaluru, India
Contact: kavita@iisc.ac.in

Dr Maria Thaker,
Centre for Ecological Sciences, Indian Institute of Science, Bengaluru, India
Contact: mthaker@iisc.ac.in

Dr Vishwesha Guttal,
Centre for Ecological Sciences, Indian Institute of Science, Bengaluru, India
Contact: guttal@iisc.ac.in